Book Review

**Wellington After the Quake: The Challenge of Rebuilding Cities**, Earthquake Commission and Centre for Advanced Engineering, 1995.

By Mark Milke, PhD, CPEng

*"Unlike other disaster sites we have been told about, we would not be an island of destruction in a sea of resources (Newcastle 1989, Loma Prieta 1989, Northridge 1994)—Wellington would be an island of destruction in a sea, full stop."* David Middleton, EQC General Manager, 1995.

Back in 1995, EQC and the Centre for Advanced Engineering hosted a conference called "Wellington After the Quake: The Challenge of Rebuilding Cities". The scenario for everyone to consider was a 7.5M earthquake in Wellington leading to 1600 dead, hundreds of commercial buildings damaged or collapsed, 3000 uninhabitable homes, and major damage to roads, bridges, and other lifelines. It all sounds eerily familiar.

I wasn't there at the conference and hadn't been involved in the field of disaster preparation or response until I began a project on disaster waste management in 2009, so I cannot say I'm an expert on this topic. After February, I felt I had to learn about what Christchurch would likely face in the next 5-10 years, and so decided to read this book. Maybe the viewpoint of a fringe player in this field would be of enough interest to others that I decided to tie together my gleanings from the conference proceedings.

How well did we pay attention to what people said at the conference? My answer would be that we're doing pretty well at learning lessons, except for the key one, which was that we should have done more planning of how to recover, and not just respond, after an earthquake.

Planning after a disaster is too late because it is so much more difficult to reach social agreement afterwards. Steven French of Georgia Tech Univ. made this point at the conference and noted that, especially after earthquakes, long delays in recovery can result from attempts to come up with rebuilding plans, and all because people try to solve not only the recovery problem but to also fix problems perceived to have existed before the disaster. Large changes in urban layout, design, and philosophy are made more difficult, not easier, by the disaster. Earthquakes in particular (in contrast to, say, cyclones) leave a patchwork of remaining buildings that will make wholesale change costly. In addition, the high emotions and social tensions resulting from a disaster make it more difficult, not easier, to bring about social change. Changing the form of a city means changing its roads, sewers, and power systems, but even with major infrastructure damage, the additional cost of shifting to new places or methods is far too high, and would come at a time when funds are critically needed elsewhere. What I took from this analysis was that to an extent not appreciated, we should look to rebuild, and afterwards enter into discussion about change.

One of the critical drivers that limit change during recovery is the need to reinstate commercial and industrial activity as quickly as possible. Steven French emphasised creative approaches that were taken after the Northridge earthquake to get commerce active again, including shopping bazaars in local parks. Commercial activity can benefit from small changes instituted with a rebuild and he gives the example of Santa Cruz where the rebuilt area was more attractive to shoppers. Similarly the creation of open space along riverbanks because of past liquefaction can be included to enhance commercial activity.

Another speaker, Christopher Henri from the Insurance Council of Australia, brought up a related point about planning after a disaster, based on his experiences in Darwin after the 1974 cyclone. The Reconstruction Commission there decided not to develop a new City Plan, which would take too long, or to enforce the old City Plan, with its exposed inadequacies and irrelevance to a new setting. Instead, the Commission brought in a number of ways to encourage or discourage certain practices, rather than setting new rules or making long-lasting decisions on particular land use applications. This gave them flexibility and also gave individual land owners and businesses an ability to be creative in their response. Over time, as decisions were made and it became clearer through a series of case-by-case decisions which landuses were appropriate where and under what conditions, I would imagine that the City would codify common practice into a new city plan. This flexibility and emphasis on outcomes rather than methods would seem a good way forward during a recovery.

A number of the speakers brought up problems of delay during a recovery. The inter-governmental squabble over historic buildings after Loma Prieta led to long delays, and also wasted administrative effort. Which buildings to save? To what standard should the repair be conducted? Who would pay? An agreed policy in advance of the event could have saved years of meetings, consultant reports, court cases, and delays. Hopefully, NZ TLAs are moving in this direction now. After the cyclone hit Darwin, the slow deliberations over what the new Building Code should be led to overall recovery delays. Although we cannot plan to revise a building code only after death and destruction, we can be ready to incorporate new knowledge quickly, and IPENZ has led the way in doing so here.

The one case study of delays in the book that haunted me the most was of the 1987 Whittier earthquake in the Los Angeles Basin, where a 5.9M shallow earthquake hit in a highly urbanised area. Recovery there went extremely slowly, to allow for a comprehensive plan of the land use and character of redevelopment. In addition to the problem of no pre-earthquake plan for redevelopment, and the problem of delays arising from the time required to develop a detailed, prescriptive plan afterwards, Whittier had problems with slow approvals of building permits, shortage of administrative staff, debates over historic buildings, and a general shortage of labour needed for recovery. The delays led to lawsuits, which led to further delays.

Labour issues are mentioned a number of times in the book as significant bottlenecks in recovery programmes. Early on, the accommodation of recovery workers can be a major issue. Earthquakes are likely to hit lower-income housing disproportionally, decreasing the availability of short-term accommodation for workers. Tony Lanigan, a management consultant, looked at all the potential labour, material, and equipment bottlenecks in the 1995 Wellington recovery scenario, and considered accommodation of labour to be the most critical. Frank Holmes, then Director of the Bank of New Zealand, highlighted a need for government to change its "… training programmes and immigration policies to ease potential shortages of labour…" and so preserve "… reasonable stability of prices". These issues of labour quantity and quality and inflation impacts are likely to become greater issues as rebuilding gains momentum. There is plenty for the new CERA to worry about!

But at least we have a CERA. A number of the conference participants discussed the difficulties that have arisen when there has been no central authority responsible for recovery. Having one central authority can prevent some of the inter-institutional paralysis, delays and excess costs in recovery. However, these central authorities still need to be receptive to the public and to communicate effectively. Without care, the tension between acting quickly and communicating effectively is bound to snap. In Darwin, a Citizen Advisory Council was established that bypassed elected officials and received direct input from residents, and it was found to be effective. Another response that caught my attention was in relation to the 1989 Newcastle earthquake. Henri describes the development and distribution of a report entitled "Factors influencing structural behaviour of

residential buildings in Newcastle". Providing this document to all builders, structural engineers, and insurance inspectors, as well as to interested building owners proved very useful. Before its release, a large number of misunderstandings and inconsistencies in explanations had increased social tension. For example, a houseowner would wonder why their house had been assessed as having only $10,000 of damage, while the neighbours had been assessed as a total loss. The need for information related to complex technical decision-making on the status of buildings will remain strong in Christchurch for many years.

Peter Yanev, of what is now the risk assessment firm ABS Consulting, estimated that 50% of the insurance payout after the Northridge earthquake was, in effect, insurance fraud. Policy owners claimed for damage that was not due to the earthquake, and the cost of 'repairs' was more than the minimum required. If this is a precedent, New Zealand is about to see some friction between insurance companies and EQC on the one side and building owners on the other. The need for proper cost control systems and clear communication will be very high. I do not want a job handling insurance claims anytime soon.

The other eye-opener from the insurance industry related to how poorly premiums match the underlying risk from natural disasters. Peter Yanev noted how many insurance companies offering earthquake cover quoted similar rates independent of how the sub-surface risk varied. He provided a number of details from the Northridge earthquake on how his company had done better compared with others in terms of payouts. His company had years previously begun selling earthquake insurance to those they thought were safer than most, undercutting the cost of the broad-brush insurers. They looked at detailed geotechnical assessments, considering the distance to known faults, the soil condition, and the geology. Their method is so obvious, and maybe things have changed since 1995, but it still leads to the question, why isn't this common practice? Surely it would make sense for society to assess, pre-disaster, the site's risk and also the ability of the building to withstand a disaster load, and charge insurance accordingly.

I think much of the answer lies in the role today of 're-insurers'. Reinsurers insure the insurance companies against very large payouts on rare events such as earthquakes. From the viewpoint of the insurance company, there is little incentive to pay the extra cost in assessing risk when they know that in any large disaster they will pay the same amount, and the re-insurance company will pay the extra associated with their having made poor estimates of risk. On the other hand, there's no doubt that re-insurers pay great attention to the risk and that they conduct detailed investigations using the latest science and technology. Werner Schaad from Swiss Re provided a detailed examination of the cost of a major earthquake in Wellington. What he did not make clear was whether re-insurers would charge insurance companies less if they issued more risk-dependent insurance policies. In the end, if the economic signal of risk does not make its way to the property owner, we are just setting ourselves up for paying more as a society for every disaster.

At some point, we need to turn hindsight into foresight. The conference back in 1995 put a great deal of effort into helping Wellington prepare for its future 'big one'. In some ways, it's an excusable failure of imagination to institute policies in a country when it has not had a disaster before of the scale that was envisioned for Wellington back in 1995. It is even more excusable that Christchurch did not have a detailed earthquake recovery plan in place pre-disaster. From now on, what will be much more difficult to excuse would be other parts of New Zealand not planning now for a future disaster, and being left instead with rubble, damaged citizens and a slow, difficult recovery.